

State of Hawaii
DEPARTMENT OF LAND AND NATURAL RESOURCES
Division of Forestry and Wildlife
Honolulu, Hawaii 96813

May 13, 2010

Chairperson and Members
Board of Land and Natural Resources
State of Hawaii
Honolulu, Hawaii

Aloha Land Board Members:

SUBJECT: PROGRESS BRIEFING TO THE BOARD OF LAND AND NATURAL RESOURCES REGARDING HAWAII'S **"STATEWIDE ASSESSMENT OF FOREST CONDITIONS AND RESOURCE STRATEGY"**

SUMMARY

It is my pleasure to brief the Board of Land and Natural Resources on our progress in completing Hawaii's "STATEWIDE ASSESSMENT OF FOREST CONDITIONS AND RESOURCE STRATEGY (SWARS)". These two documents will help DOFAW and our stakeholders assess the conditions of our forests, watersheds, native species, forest products industry and forest recreational opportunities and will outline our strategy to protect, manage and sustain these resources for current and future generations.

Today's briefing will summarize our process, what we identified as our critical issues, and how we are developing our Strategies to sustainably manage our natural resources.

The Hawaii SWARS is being produced by the Division of Forestry and Wildlife (DOFAW) to fulfill a mandate of the Redesign effort¹ of the State and Private Forestry (S&P) organization within the U.S. Forest Service in conjunction with a suite of new provisions added to the Forestry Title of the 2008 Farm Bill (P.L. 110-234). Hawaii SWARS meets the legal requirements set forth by the 2008 Farm Bill and it directly addresses the National Outcomes and Objectives of the S&P Redesign to 1) Conserve Working Landscapes, 2) Protect Forests From Harm and 3) Enhance Public Benefits Associated with Trees and Forests.

All US states, territories and the Pacific Island Freely Associated States are required to submit a first Assessment and Strategy to the US Secretary of Agriculture no later than June 18, 2010.

¹ The purpose of the State & Private Forestry Redesign is to create a new approach to State and Private Forestry in order to shape and influence forest land use on a scale, and in a way, that optimizes public benefits from trees and forests for both current and future generations.

We have used this process as an opportunity for DOFAW to promote new collaborative efforts among the many agencies, institutions and landowners actively involved in the stewardship of Hawaii's natural resources.

The basic requirements of this effort will be to:

- Identify and provide an analysis of present and future forest conditions, trends, and threats on all land ownerships.
- Identify any areas or regions of the state that are a priority.
- Identify any multi-state areas or issues that are a regional priority.
- Incorporate all approved Federal, State, Local and natural resource management plans.
- Develop long-term strategy to address threats to forest reserves and resources needed to implement the strategy.

This effort is unique in many ways, it involves all landownership - state, private and federal, and views forests and trees as a whole and not by programs. The states and territories were granted a great deal of flexibility in preparing their Assessment and Strategy documents to best meet the unique needs of each state. The Redesign Process and the 2008 Farm Bill did however, include a set of requirements that each state must fulfill.

As part of this process, that each state forestry agency had to coordinate with the State Forest Stewardship Coordinating Committee, the State Technical Advisory Committee of the Natural Resources Conservation Service, the State Urban Forestry Council, state wildlife agency and applicable federal land management agencies to ensure that their completed Assessment and Strategy addresses the rural-to-urban landscape continuum and identifies opportunities for program coordination and integration. The Farm Bill explicitly directed the states to integrate the Comprehensive Wildlife Conservation Strategy (CWCS), and the Statewide Comprehensive Outdoor Recreation Plan (SCORP), all Community Wildfire Protection Plans (CWPP's), and other relevant plans.

The Division has met these requirements in developing our Assessment and Strategy.

In a series of meetings with our stakeholders we identified 9 issues. For each issue we characterized the trends, the existing conditions, the threats and benefits of our forest landscapes. We created maps with the most current public information available, identified priority areas and developed a set of strategies for addressing the issues identified in partnership with our stakeholders.

The required deliverable products from this project are the Hawaii's Assessment of the condition of our Forests as they are in 2010, and our 5-10 year Strategy. A summary of the issues and strategy is attached for your information and any input. Once compiled, the document will be circulated to our Partners and posted on the DOFAW SWARS webpage for public information and input. The Hawaii SWARS will be completed and submitted to the Secretary of Agriculture by the June 18th deadline.

This process and the document we will produce is of value because it will enable the Division to seek and base funding on landscape scale management and not only on narrow program mandates. This initiative offers us an opportunity to plan, and integrate the many programs we work on together under one document. We have an opportunity to demonstrate the value of our forests and trees to the State and nation, and describe our strategy to work together to protect our forests from harm, and conserve forests in a working landscape. The information and data we produce will be of use to others in the future. Hopefully, this information will be useful to influence our communities, our State and national legislators, and our government leaders to invest in Hawaii's forests for the future.

The document we are preparing represents the beginning of a process, not the end, where we will continually update and inform our collective understanding of our forest assets and what is affecting them, and apply that knowledge to guide and improve our management. The initial assessment and strategy, will evolve over time and we will continue to seek input from our partners and communities to update and improve upon it.

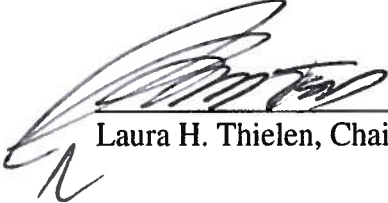
Attachments

Respectfully Submitted,



PAUL J. CONRY, Administrator
Division of Forestry and Wildlife

APPROVED FOR SUBMITTAL:



Laura H. Thielen, Chairperson

Issue 1: Water Quality and Quantity

The importance of abundant, clean fresh water is the single most important resource for survival on a tropical island. The Division of Forestry and Wildlife was established to create and manage the Hawaii Forest Reserve System whose main function is to protect the groundwater recharge areas by maintaining a healthy forest. This document incorporates by reference all existing approved water management plans that have been developed by the Commission on Water Resource Management (CWRM), the Office of Planning, the County Boards of Water Supply and the Watershed Partnerships

State Issue: Watershed Management: Controlling Feral Ungulates and Invasive Species

Long-term Strategy	Priority Landscape Area(s)	Program Areas that Contribute	Key Stakeholders	Resources Available/Required to Implement	Measures of Success	Supports National Objectives
1. Control established and incipient invasive species by carrying out weed surveys, creating and implementing prioritized weed management plans for watershed partnership areas.	Watershed Partnership Areas Statewide	Watershed Partnerships, Natural Area Reserves System, DOFAW Wildlife and Forestry Sections, Hawaii Invasive Species Council, USFS Forest Health and Special Technology Development Program.	Private and public watershed partnership landowners, Dept. of Hawaiian Homelands, Office of Hawaiian Affairs, University of Hawaii, Hawaii Counties, National Tropical Botanical Garden, USFWS, NPS, USFS, NRCS, TNC, USGS, US Army, County water departments.	<ul style="list-style-type: none"> Natural Area Reserve Fund (Conveyance Tax), other state funds US Fish and Wildlife Service Forest Health grants Special Technology Development Program Americorps Internships Hawaii Invasive Species Council Maui County 	<ul style="list-style-type: none"> Acres surveyed/ treated for invasive species that threaten watersheds Number of weed management plans completed or updated 	<ul style="list-style-type: none"> 1.1 1.2 2.1 3.1 3.4 3.5
2. Control feral ungulates through fencing, public and staff hunting, trapping and other approved methods.	Watershed Partnership Areas Statewide	Watershed Partnerships, Natural Area Reserves System, DOFAW Wildlife and Forestry Sections, Hawaii Invasive Species Council, USFS Forest Health.	Private and public watershed partnership landowners, Dept. of Hawaiian Homelands, Office of Hawaiian Affairs, University of Hawaii, Hawaii Counties, National Tropical Botanical Garden, USFWS, NPS, USFS, NRCS, TNC, USGS, US Army, County water departments.	<ul style="list-style-type: none"> Natural Area Reserve Fund (Conveyance Tax), other state funds. US Fish and Wildlife Service Maui County 	<ul style="list-style-type: none"> Number of acres fenced Miles of fence line inspected and maintained Number of feral ungulates removed 	<ul style="list-style-type: none"> 1.2 2.2 3.1 3.4 3.5 3.6

3. Increase public involvement in watershed management through outreach, education and volunteer programs for children and adults that integrate science with Hawaii's unique cultural traditions.	Statewide	Watershed Partnerships, Hawaii Association of Watershed Partnerships, DOFAW Education and Outreach, Conservation Education, Hawaii Invasive Species Council, State Department of Education, Hawaii Environmental Education Association	Same as above.	<ul style="list-style-type: none"> Natural Area Reserve Fund (Conveyance Tax), other state funds US Fish and Wildlife Service Americorps Internships Hawaii Invasive Species Council Maui County 	<ul style="list-style-type: none"> Number of outreach events and presentations Number of participants in outreach and education events Number of volunteers participating in watershed events 	3.6
4. Raise the capacity of Watershed Partnerships to share watershed management expertise, build public support, create sustainable funding, and develop new policies and laws.	Statewide	Hawaii Association of Watershed Partnerships, The Nature Conservancy	Same as above	<ul style="list-style-type: none"> Natural Area Reserve Fund (Conveyance Tax), other state funds 	<ul style="list-style-type: none"> Number of watershed symposia and meetings Total annual funding for watershed partnerships New policies or laws enacted 	3.6
5. Work closely with other programs to address additional key watershed threats such as fire, diseases, and inappropriate human use.	Watershed Partnership Areas Statewide	Watershed Partnerships, DOFAW Fire, Forestry, Sections, Forest Health	Same as above	<ul style="list-style-type: none"> Natural Area Reserve Fund (Conveyance Tax), other state funds Forest Health 	<ul style="list-style-type: none"> Number of projects completed related to fire, disease, and human activity 	1.2 2.2 3.1 3.3 3.4 3.5 3.6
6. Restoration of native species in priority watershed forests and eroded areas.	Watershed Partnership Areas Statewide	Watershed Partnerships, USFWS, USFS	Same as above	<ul style="list-style-type: none"> Natural Area Reserve Fund (Conveyance Tax), other state funds US Fish and Wildlife 	<ul style="list-style-type: none"> Number of plants planted Number of plants surviving after 1.2. 	1.1 1.2 2.2 3.1

Reviewers for the forest health chapter of the SWARS are:
 Tanya Rubenstein
 Meiora Purrell
 TNC- Jason Sumiyé or Mark Fox

Issue 2: Forest Health: Invasive Species, Insects and Disease

Hawaii Forest Health Strategies

Forest Health in Hawaii: Managing Invasive Species and Forest Pests

Although Hawaii is one of the most isolated island chains in the world, it is the center for travel and transport of goods to the Pacific and far west. As such, many invasive and non-native species have been introduced and the islands are regularly threatened by human induced introductions of non-native species. Management of invasive species in Hawaii involves working in diverse areas. Many species are initially detected in urban areas, around harbors and ports, along roadways, and in people's yards. If eradication is not initially possible they can quickly spread to adjacent forested watersheds. Much of Hawaii's low elevation forests, and where control of incipient populations frequently occurs, is predominantly made up of non-native species. Actions are taken to protect priority forest areas where native ecosystems remain largely intact, primarily at higher elevations. Maintenance of these priority forest areas requires ongoing monitoring and control of invasive species.

Forest Health						
Long-term Strategy	Priority Landscape Area(s)	Program Areas that Contribute	Key Stakeholders	Resources Available/Required to Implement	Measures of Success	Supports National Objectives
1. Prevent harm from new invasive species by improving biosecurity policies, establishing early detection networks, and supporting island-wide eradication and containment for species with limited distributions.	Ports, urban areas, urban interface areas, roadsides, agricultural lands and natural areas.	Hawaii Invasive Species Council, Invasive Species Program (Wildlife), Forest Health, Urban and Community Forestry, Watershed Partnerships, Hawaii Tourism Authority, DOD, USGS Pacific Basin Information Node	USFWS, NPS, USFS, NRCS, USDA APHIS WS, USDA APHIS PPQ, CBP, DHS, HDOA, DOT, HDOH, DBEDT, UH, TNC, Hawaii Counties, private landowners, Landscape Industry Council of Hawaii	<ul style="list-style-type: none">• Conveyance Tax, state funds, Invasive Species Committees• Coordinating Group on Alien Pest Species• Forest Health grants• Hawaii Invasive Species Council	<ul style="list-style-type: none">• Number of eradication per year• Number of interceptions of forest weeds and pests by quarantine agencies• Acres surveyed/treated for incipient invasive species	<ul style="list-style-type: none">1.22.23.13.43.5
2. Develop new tools to increase effectiveness of invasive species management, including biological control.	Statewide	Hawaii Invasive Species Council, Invasive Species Program (Wildlife), Forest Health, Special Technology Development Program, competitive grants	University of Hawaii, USFWS, US Forest Service, USDA APHIS WS, USDA APHIS WS NWRC, HDOA, UH, TNC, Hawaii Agriculture Research Center, Watershed Partnerships, Endangered Species projects	<ul style="list-style-type: none">• Hawaii Invasive Species Council funds• STDP• Forest Service Research• HDOA staff and facility• UH scientists	<ul style="list-style-type: none">• Number of new tools developed• Reduced price per acre protected	<ul style="list-style-type: none">1.22.23.13.43.5

Hawaii Forest Health Strategies

3. Increase public support and involvement in invasive species prevention and control.	Statewide	Conservation Education, Hawaii Invasive Species Council, Invasive Species Program (Wildlife), Forest Health, Watersheds, Urban and Community Forestry, competitive grants	Public, agricultural industry, horticultural users and workers, land management agencies	<ul style="list-style-type: none"> Hawaii Invasive Species Council funds State special funds HISC and CGAPs outreach staff Forest Service grants DOFAW staff 	<ul style="list-style-type: none"> Number of new invasive species reports to the state hotline Increasing public support for natural resource protection Number of outreach events and presentations 	3.6
4. Monitor invasive species and forest pests for trends to inform management activities	Ports, urban areas, urban interface areas, roadsides, agricultural lands and natural areas.	Hawaii Invasive Species Council, Invasive Species Program (Wildlife), Forest Health Protection, Forest Health Monitoring, Urban and Community Forestry, Watershed Partnerships, competitive grants	USFWS, NPS, USFS, NRCS, USDA APHIS WS, USDA US Forest Service, NPS, USGS BRD, APHIS, HDOA, DOT, DBEDT, UH, TNC, Hawaii Counties, private landowners, Resource Mapping Hawaii, HAWP	<ul style="list-style-type: none"> Conveyance Tax, state funds, Hawaii Invasive Species Council Coordinating Group on Alien Pest Species Forest Health Monitoring Lab facilities 	<ul style="list-style-type: none"> Acres surveyed for invasive plants or mortality 	1.2 2.2 3.1 3.4 3.5
5. Work closely with other programs such as Urban and Community Forestry and Watershed Partnerships to ensure an integrative approach to management of invasive species.		Forest Health, Urban and Community Forestry, Forest Stewardship, Wildlife Management, Conservation Education, competitive grants	Kaulamuni, Forest Stewardship Council, Hawaii Association of Watershed Partnerships, Invasive Species Committees, Hawaii Invasive Species Council	<ul style="list-style-type: none"> DOFAW and US Forest Service personnel 	<ul style="list-style-type: none"> Number of projects with multiple programmatic objectives 	1.2 2.2 3.1 3.4 3.5

Reviewers for the forest health chapter of the SWARS include:

Pat Conant, Hawaii Department of Agriculture
Lloyd Loope, United States Geologic Survey - Biological Resources Division
Teya Penntman, Maui Invasive Species Committee

Issue 3: Wildfire

Wildfire in Hawaii

Unlike ecosystems and forests in most of the continental states, Hawaii's ecosystems are not adapted to wildfire. Except in active volcanic areas, fire is not a part of the natural life cycle of native Hawaiian ecosystems, and only a few native species are able to regenerate after a fire. Wildfires in Hawaii place communities at risk, destroy irreplaceable cultural resources, cost taxpayers money, negatively impact drinking water supplies and human health, increase soil erosion, impact near shore and marine resources, and destroy native species and native ecosystems.

Wildfire							
Long Term Strategy	Priority Landscape Area(s)	Secondary Issues Addressed	Program Areas that Contribute	Key Stakeholders	Resources Available/required	Measure of Success	Supports National Objective
Reduce the impacts of wildfires on native ecosystems and watersheds	forest reserves, public hunting areas, wildlife and plant sanctuaries and natural area reserves		Cooperative Fire Assistance	State Civil Defense; County Civil Defense; County Fire Departments; Volunteer Fire Departments; National Park Service; U.S. Forest Service; U.S. Army Garrison Hawaii; U.S. Fish & Wildlife Service	Dept. Firefighter Contingency Fund; State Fire Assistance; Volunteer Fire Assistance; Wildland Urban Interface competitive grants	Number of acres protected	1.2
						Number of homes & structures protected	2.1
						Number of populations of T&E species protected	2.2
							3.1
							3.3
							3.5
Reduce the impacts of wildfires on communities	Communities at Risk		Cooperative Fire Assistance	HI Wildlife Mgmt. Organization; County Fire Departments; Community Associations; County Civil Defense	State Fire Assistance; Wildland Urban Interface competitive grants	Number of homes protected	2.1
							2.2
							3.3
							3.6

Issue 4: Urban & Community Forestry

Hawaii's Urban and Community Forest is an Asset to the Community

The urban and community forestry strategies were identified and prioritized in a collaborative effort by the Kaulunani Council and other urban forestry leaders. Most apparent was the need to fund a tropical urban forest strategic plan, measure and map the urban forest, educate the community about trees, and to look at the urban forest as an integral component of the green infrastructure. The strategies and the priority landscapes identified here can provide that data and increase the knowledge and understanding of tropical urban trees.

Urban and Community Forestry Priority One Goals							
Long Term Strategy	Priority Landscape Areas(s)	Secondary Issues Addressed	Program Areas that Contribute	Key Stakeholders	Resources Available & Implementing Partners	Measures of Success	Supports National Objectives
1. Urban canopy assessment & inventory	Assess urban forests in HI, for example Honolulu and Kapolei, based on impervious surfaces	inventory urban forests in Hawai'i	Competitive grants, U&CF grants	Counties State Utilities Non-profits	UCF, private/stakeholder donations, county governments	Increased canopy cover	1.2 3.4
2. Establish a tropical urban & community forestry research center	<ul style="list-style-type: none"> Hawaii Pacific Caribbean International 	Tropical urban forest strategic plan	Competitive grants, U&CF	PSW Research Station Hawai'i state and county governments University of Hawai'i	PSW Research Station, University of Hawai'i Arboretums, Botanical Gardens, Non profits, Arborists, FHUF	Research strategic plan completed	1.1 1.2 2.2 3.1 3.2 3.4
3. UCF educational & public outreach resources	<ul style="list-style-type: none"> Industry School age students Public Tourists 	Inventory existing educational resources	UCF, competitive grants, Conservation Education	Practitioners, scientists, non profits, governments, Hawai'i Tourism Authority	Use UCF grant for inventory, Private/stakeholder donations	Comprehensive inventory completed and education grant proposed	1.2 2.2 3.1 3.2 3.4 3.6 3.7
4. Produce GIS Maps	<ul style="list-style-type: none"> Urban, rural, agriculture zoned lands. Urban/coastal zone interface, Wildland/urban interface, Invasive species in 	Need for additional maps not yet determined	State, counties, UCF grants,	State, University, practitioners, non -profits, counties	DOFAW, Use UCF funds for GIS maps, County data	Priority landscapes mapped	1.1 1.2 2.2 3.2 3.3 3.4 3.6 3.7

Hawai`i Urban and Community Forestry Strategies

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	<ul style="list-style-type: none"> urban -wildland Future urban development, Impermeable surfaces, Canopy cover, Stream channels through urban areas. 						
5. Outsource UCF program	<ul style="list-style-type: none"> Outsource program to a non profit 	Ability to attract additional funds	UCF and competitive grants	Non profit, DOFAW, UCF Council	UCF grants, competitive grants, private/stakeholder donations	Program expanded, new donor base, more opportunities for funding and projects.	1.2 3.4 3.6 3.7

Urban and Community Forestry Priority Two Goals

Long Term Strategy	Priority Landscape Areas(s)	Secondary Issues Addressed	Program Areas that Contribute	Key Stakeholders	Resources Available & Implementing Partners	Measures of Success	Supports National Objectives
1. Tropical U&CF management plan	All Hawai`i counties	Identify plans, policies, ordinances, rules and laws impacting Hawai`i's urban forest	U&CF grants, Western competitive grants, counties	Public, decision makers, county parks and recreation, county arborists county planning, practitioners	Counties, non-profits, UCF funds, University	UCF management plan template developed and implemented	1.2 2.2 3.4 3.7
2. Mitigate environmental impacts of urbanization	Future development, watersheds, areas with high impervious surfaces	Base line research for tropical low impact development tools	Watershed, DOFAW, U&CF, counties	Counties, watershed partners, University, USACE	Watershed partnerships, use UCF funds, University CTAHR, Counties, non profits.	New standards for low impact development developed	2.2 3.1
3. Demonstration urban-watershed project	Identify partners, project site and urban watershed	Collaboration with watershed partners	U&CF, watershed partners	UCF, watershed partners,	Watershed partners, UCF to fund trees	Template for urban-watershed projects	3.1 3.4 3.6

Urban and Community Forestry Priority Three Goals

Hawai'i Urban and Community Forestry Strategies

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Long Term Strategy	Priority Landscape Areas(s)	Secondary Issues Addressed	Program Areas that Contribute	Key Stakeholders	Resources Available & Implementing Partners	Measures of Success	Supports National Objectives
1. Mitigate impacts of invasive species from the urban forest on native ecosystems	Urban invasive species outbreaks in the urban wildland interface Commercial industry, ports of entry, and nurseries and botanical gardens	More native and non invasive plants in trade, grower rewards	State, U&CF, competitive grant	Private nurseries, UH, colleges, botanical gardens, ASLA, DLNR, DOFAW, HI Invasive Species Committee	State, federal, UH, CGAPS	Mapped invasive species in urban/wildland interface.	2.2 3.6
2. Use trees as a tool to mitigate the effects of sea level rise	Vulnerable urban forest areas based on sea level rise	Tree species in coastal area	UCF, Coastal, western competitive grant	State, County, U&CF	State - Office of Conservation and Coastal Lands UCF funds	Vulnerable areas and appropriate coastal tree species	3.4 3.6 3.7

Issue 5: Climate Change/Sea Level Rise

There is an emerging consensus that the climate of the planet is changing as a result of human-induced activities. The impacts on small islands will likely include a rise in mean sea-level, increased frequency and severity of storms, increased incidences of flash flooding, and changes in rainfall. Small islands will have to develop strategies to adapt to these changes, and to mitigate their impacts.

Climate Change/Sea Level Rise

Long-term Strategy	Priority Landscape Area(s)	Program Areas that Contribute	Key Stakeholders	Resources Available/ Required to Implement	Measures of Success	Supports National Objectives
I. Develop and implement a Statewide coordinated Statewide Instrumentation Improvement Strategy (SIIS) to identify data gaps and enhance data collection and monitoring systems.	Statewide	Fire & Aviation, Forest Health Protection, Urban & Community Forestry, Conservation Education, schools, volunteer groups	Hawai'i Conservation Alliance, Pacific Islands Climate Change Cooperative (PICCC), USFWS, NPS, USDA, HDOA, DOT, The Nature Conservancy, NOAA Office of Ocean & Coastal Resource Management, NOAA NWS, DOD, CWRM, University of Hawai'i School of Ocean & Earth Sciences, USGS, NWHI, EPA, USACE	⇒ USFWS (on NWHI) ⇒ USGS ⇒ University of Hawai'i scientists and graduate students ⇒ NOAA and National Weather Service ⇒ NASA ⇒ USDA Forest Service ⇒ USACE	⇒ New instrumentation for improving the evaluations of local and regional trends in climate and ecosystems. ⇒ New monitoring that fills existing gaps in baseline knowledge of Hawaiian biodiversity ⇒ Monitoring systems are sufficient for assessing the effectiveness of management activities designed to facilitate climate adaptation	

Climate Change/Sea Level Rise

Long-term Strategy	Priority Landscape Area(s)	Program Areas that Contribute	Key Stakeholders	Resources Available/ Required to Implement	Measures of Success	Supports National Objectives
2. Assess the vulnerabilities, risks, and opportunities for important resources, infrastructure, and ecosystems using knowledge of trends and future scenarios of climate change.	Urban and coastal zones	Urban & Community Forestry, Forest Health Protection, Watershed Partnerships, Fire & Aviation, EQIP, WHIP, Forest Legacy, Forest Stewardship, Forest Land Enhancement Program	Hawai'i Conservation Alliance, NOAA Office of Ocean & Coastal Resource Management, NOAA Pacific Services Center, OHA, DOD, Hawai'i Tourism Authority, USFWS, NPS, DOT, Office of Planning, HDOA, The Nature Conservancy, Board of Water Supply, City and County of Honolulu, Department of Planning for County of Hawai'i, Department of Planning for County of Maui, Department of Planning for County of Kauai, DOH, Marine & Coastal Zone Advocacy Council, US Army Corps of Engineers, US Coast Guard, UH Sea Grant Program	⇒ Department of Interior (PICCI) ⇒ USDA Forest Service competitive grants ⇒ Center for Island Climate Adaptation and Policy (ICAP) at UH ⇒ DOFAW staff	⇒ Vulnerability assessments that describe exposure, sensitivity, and capacity to adapt to climate change scenarios for ecosystems, resources, and landscapes ⇒ Program areas prioritize actions with the most beneficial outcomes based on risk analyses and assessments of how land management activities can contribute toward facilitated adaptation.	

Climate Change/Sea Level Rise

Long-term Strategy	Priority Landscape Area(s)	Program Areas that Contribute	Key Stakeholders	Resources Available/ Required to Implement	Measures of Success	Supports National Objectives
3. Develop and implement facilitated adaptation strategies for forest and resource conservation management; monitor effectiveness; continually incorporate new information; and, adjust actions as needed.	Urban and coastal zones	Urban & Community Forestry, Forest Health Protection, Watershed Partnerships, Fire & Aviation, EQIP, WHIP, Forest Stewardship, Forest Legacy, Forest Land Enhancement Program	Hawai'i Conservation Alliance, NOAA Office of Ocean & Coastal Resource Management, NOAA Pacific Services Center, OHA, DOD, Hawai'i Tourism Authority, USFWS, NPS, DOT, Office of Planning, HDOA, The Nature Conservancy, Board of Water Supply, City and County of Honolulu, Department of Planning for County of Hawai'i, Department of Planning for County of Maui, Department of Planning for County of Kauai, DOH, Marine & Coastal Zone Advocacy Council, US Army Corps of Engineers, US Coast Guard, UH Sea Grant Program	⇒ ICAP ⇒ Department of Interior programs (PICCC)	⇒ Adoption of a State of Hawai'i climate change adaptation plan ⇒ Implementation of anticipatory actions intended to prevent serious disruptions in forests and ecosystem services due to changing climate. ⇒ Implementation of opportunistic actions that take advantage of man-made or natural disturbance events to facilitate adaptation to future climate. ⇒ A reiterative process, involving continual monitoring and incorporation of new science into planning, policies, and decisions	

Climate Change/Sea Level Rise

Long-term Strategy	Priority Landscape Area(s)	Program Areas that Contribute	Key Stakeholders	Resources Available/ Required to Implement	Measures of Success	Supports National Objectives
4. Help landowners, conservation managers, and the public understand changing conditions; and, establish strong alliances and partnerships with other programs, agencies, and stakeholders to ensure a coordinated and collaborative approach to climate change adaptation.	Statewide	Conservation Education, Forest Heath Protection, Urban & Community Forestry, Fire & Aviation, EQIP, WHIP, Forest Stewardship, Forest Land Enhancement Program	Coastal industries, landowners, schools, Hawai'i Tourism Authority, Hawai'i Conservation Alliance, NOAA Office of Ocean & Coastal Resource Management, NOAA Pacific Services Center, USFWS, NPS, US Army Corps of Engineers, The Nature Conservancy, UH Sea Grant Program	⇒ Forest Stewardship funds ⇒ Forest Land Enhancement funds ⇒ Conservation Education Program funds ⇒ Department of Interior programs (PICCC)	⇒ Number of trained individuals, specializing in climate change adaptation and mitigation, who educate landowners, managers, and the public ⇒ Institutional and public support and encouragement for implementing innovative approaches for facilitated adaptation Strategies, policies, and actions for addressing climate change are integrated across all programs areas.	

Issue 6: Conservation of Biodiversity

The biological heritage of Hawaii is unparalleled in the world. The extreme isolation of the Hawaiian archipelago, combined with an extraordinary diversity of habitats has lead to the development of unique species and ecosystems found nowhere else in the world. These ecosystems have intrinsic value, and also provide the residents of these islands with essential ecosystem services such as food, water and nutrient cycling. Hawaii's unique ecosystems are also vulnerable to introduced insects, plants, animals and diseases. Protection of Hawaii's biodiversity is one of the main functions of the Department of Land and Natural Resources.

Biodiversity Objective/Management Strategy: Maintenance of native ecosystems and species.						
Long Term Strategy	Priority Landscape Area(s)	Secondary Issues Addressed	Program Areas that Contribute	Key Stakeholders	Resources Available & Implementing Partners	Measures of Success
1) Engage in conservation to maintain intact native ecosystems and species (including plants, forest birds, and invertebrates)	See "TBD Maintenance" Category of Map. Landscapes dominated by native species with intact structure and function. And critical, essential or recovery habitats as identified in Hawaii's Comprehensive Wildlife Conservation Strategy (CWCS) and by the USFWS.	Other ecosystem services including water quality and quantity, flood control, open space, ecotourism	Various governmental and private programs incl: Forest health, Competitive grants, Section 7 USFWS funding, USFS, DOFAW	Public and private landowners and conservation agencies and organizations including DLNR, HAWP partners, TNC, rare plant nurseries, seed storage facilities, PEP	Contributing program areas, facilities and infrastructure including (e.g. captive breeding facilities, seed storage, nurseries); research and monitoring technologies and partnerships (e.g. aerial imagery); natural resource management personnel, existing partnerships (e.g. Watershed Partnerships) PEP, USFWS, USFS	<ul style="list-style-type: none"> Invasive species removed Acres of fenced, ungulate free habitat, created and maintained Acres of predator controlled habitat Acres protected by fuel breaks created and maintained Number of native species re-introduced Plant genetic materials secured in seed storage facilities. Monitoring of rare plant and animal populations Native range, widespread plant communities established
2) Maintain native dominated ecosystems (50 – 100% native) including waterbird habitat and intact coastal sites.	<ul style="list-style-type: none"> See "TBD Maintenance" category of map Native forests, grasslands, & shrublands) as designated by the newly developed hq combo AND NOT in Enhance category AND support ≤100 spp 	See above	Competitive grants, Forest Stewardship, Section 6 grants, forest legacy funding. (maybe see above?)	DLNR, Public and private landowners, HAWP partners, TNC, NAPP, NARS, rare plant nurseries, seed storage facilities, PEP (should this just state: "see above"?)	Public and private HAWP partners, TNC, NAPP, NARS, rare plant nurseries, seed storage facilities, PEP, DOFAW nurseries, (maybe see above?)	<p>In addition to the measures detailed above, this strategy would also measure:</p> <ul style="list-style-type: none"> Acres of habitat maintained for waterbirds
						1.1 1.2 2.2 3.1 3.5 3.6

Hawaii Biodiversity Strategies2

	<ul style="list-style-type: none"> plants. Areas with FWS designated core waterbird concentrations. Any coastal area designated by TNC as good to very good (~6-29 native spp). 						
Biodiversity Objective/Management Strategy: Enhance native habitat							
Long Term Strategy	Priority Landscape Areas(s)	Secondary Issues Addressed	Program Areas that Contribute	Key Stakeholders	Resources Available & Implementing Partners	Measures of Success	Supports National Objectives
3) Enhance native dominated habitat with formerly wide-spread plant species that are now limited in range	Enhancement sites (please refer to map)	See above	(maybe see above) Forest Health, Watershed health and protection, Forest stewardship, Landowner assistance programs, competitive grants	(maybe see above) DLNR, Private landowners, State Forest Lands and priority mitigations and restoration sites.	(maybe see above) Public and private HAWP partners, TNC, NAPP, NARS, rare plant nurseries, seed storage facilities, PEP, DOFAW nurseries.	<ul style="list-style-type: none"> See above 	
Biodiversity Objective/Management Strategy: Restoration							
Long Term Strategy	Priority Landscape Areas(s)	Secondary Issues Addressed	Program Areas that Contribute	Key Stakeholders	Resources Available & Implementing Partners	Measures of Success	Supports National Objectives
4) Restoration of landscapes with high potential for successful	High quality restoration sites 1km from a native-dominated landscape		Competitive grants, Forest Stewardship,	Public and private landowners, DLNR, TNC,	Public and private HAWP, partners, TNC, NAPP, NARS, rare plant nurseries, seed storage facilities, PEP	<ul style="list-style-type: none"> Invasives removed. Natural native plant regeneration. Length of barriers created to control the introduction of habitat modifying weeds and predators 	1.1 1.2 2.2 3.5

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4) Restoration of landscapes with high potential for successful restoration due to their proximity (within 1km) to substantial areas of native-dominated vegetation.	High quality restoration sites 1km from a native-dominated landscape		Competitive grants, Forest Stewardship, mitigation funds, Section 6 funding	Public and private landowners, DLNR, TNC, PEP, HAWP partners, DOD rare plant nurseries, seed storage facilities	Public and private HAWP, partners, TNC, NAPP, NARS, rare plant nurseries, seed storage facilities, PEP	<ul style="list-style-type: none"> Invasives removed. Natural native plant regeneration. Length of barriers created to control the introduction of habitat modifying weeds and predators Miles of fuel break created and/maintained. Native species re-introductions Rare plants cultivated in nurseries for outplanting. Rare plants regularly monitored. 	1.1 1.2 2.2 3.5
5) Localized restoration in non-native dominated areas with localized potential for restoration.	Restoration sites with high value post restoration: wetlands, coastlines, etc.	Information and education	Invasive Species Committee	Public and private landowners, TNC, DLNR	Public and private HAWP, partners, TNC, NAPP, DOFAW and partner nurseries, rare plant nurseries, seed storage facilities, PEP	<ul style="list-style-type: none"> Number of common native plant populations established Number of constituent native plants genetically and historically appropriate to location Soil testing and soil improvement if necessary. 	1.2 2.2 3.5
Biodiversity Objective/Management Strategy: Limited Opportunity							
Long Term Strategy	Priority Landscape Areas(s)	Secondary Issues Addressed	Program Areas that Contribute	Key Stakeholders	Resources Available & Implementing Partners	Measures of Success	Supports National Objectives
6) Degraded land management	Areas where habitat conservation has minimized the likelihood of successful restoration of native biodiversity.	Outreach and education				Please see Urban and Community Forestry Matrix for more information.	3.6
Biodiversity Objective/Management Strategy: Other??							
Long Term Strategy	Priority Landscape Areas(s)	Secondary Issues Addressed	Program Areas that Contribute	Key Stakeholders	Resources Available & Implementing Partners	Measures of Success	Supports National Objectives

http://www.fws.gov/ecos/ajax/less_public/pub/statelistingindividual.jsp?state=HI&status=listed lists 377 species. These in addition to the 48 species listed on the Federal Registry April 13, 2010 is 425 Federally listed T&E species. USFS is in the process of updating their website.

Issue 7: Recreation and Tourism

Strategy: Recreation and Tourism

Recreation and Tourism: Trails, Parks, Wildlife Associated Recreation and Hunting

Residents and visitors alike engage in recreational opportunities enhanced by Hawaii's unique natural resources. The impact of a degraded environment in general would not only diminish Hawaii's attraction to visitors but also impact the lives of our resident population whose recreational, cultural, subsistence and physical health are often closely linked with the health of the land.

Recreation and Tourism: Provide Public Access to Natural Areas							
Long Term Strategy	Priority Landscape Areas(s)	Secondary Issues Addressed	Program Areas that Contribute	Key Stakeholders	Resources Available & Implementing Partners	Measures of Success	Supports National Objectives
1. Provide public access to natural areas for outdoor recreation, including mountain/forest areas for hiking, camping, and picnicking	Public recreation sites, and right of entry through applicable private lands	• Impacts of recreational access on resources.	Na Ala Hele, NARS, DOFAW, State Parks, NPS	State Parks, NPS, County Parks, Na Ala Hele, DOFAW, NARS, USFS, TNC, private landowners	<ul style="list-style-type: none">• Conveyance Tax, state funds• Federal grants (LWCF, CELCP)• TAT and HTA	<ul style="list-style-type: none">• Increase in number of people using recreation areas per year• Reduced user conflicts	
2. Preserve open space and natural settings through public acquisition, conservation easements, and (other?).	Public recreation areas		State and County Planning offices, NOAA-CELCP, NPS-LWCF, State Legacy Land	Residents, visitors	<ul style="list-style-type: none">• Federal grants (LWCF, CELCP)• Land Trusts, Trust for Public Land• County "open space" funds• State Conveyance Tax	<ul style="list-style-type: none">• Increased acreage under public ownership or control for recreation• Expansion of park systems	
3. Promote responsible behavior and preservation of natural and cultural resources through understanding and stewardship of these resources.	Public recreation areas.	<ul style="list-style-type: none">• Awareness of the impact of invasive species on natural areas	Government & community partnerships and volunteer programs, eco-tourism companies, Park Rangers (State & NPS)	Hawaii Tourism Authority (HTA), State Parks, NPS, County Parks, DOFAW	<ul style="list-style-type: none">• TAT and HTA• State special funds	<ul style="list-style-type: none">• Increase in interpretive materials available to visitors• Increase in public support for stewardship projects	

Strategy: Recreation and Tourism

Recreation and Tourism: Priority – Provide recreational opportunities and manage game mammals							
Long Term Strategy	Priority Landscape Areas(s)	Secondary Issues Addressed	Program Areas that Contribute	Key Stakeholders	Resources Available & Implementing Partners	Measures of Success	Supports National Objectives
1. Comply with relevant state statutes (HRS 183D & 195D) and federal laws(Pittman-Robertson and Section 7 of the Endangered Species Act)	Forest reserves, leasable private lands, appropriate land locked state lands		Na Ala Hele Trails & Access Program	Outdoor recreationalists, hunters, rural communities, Hawaii Counties, private landowners	<ul style="list-style-type: none">Fees from huntersPittman-Robertson Wildlife Restoration Funds (from taxes on guns & ammunition)Appropriate land parcels	<ul style="list-style-type: none">Number of hunting licenses sold, number of hunter days in the field, game mammals harvestedNew, appropriate acres added for & removed from hunting	3.4 3.6
2. Increase the capacity to effectively manage game mammals, though better research & monitoring	Public hunting areas, private hunting lands, state leased lands		Wildlife Program, USGS-PIRG, UH-Manoa Dept. of Nat. Res. & Env. Mgmt	Hunters, rural communities, UH, Watershed Partnerships	<ul style="list-style-type: none">Fees from huntersPittman-Robertson Wildlife Restoration Funds (from taxes on guns & ammunition)Research capacity of state & federal institutions	<ul style="list-style-type: none">Number of areas & game species with basic population estimatesNumber of plans & estimates of desirable game population numbers	2.2 3.4 3.6
4. Increase effective communication between programs and the public, and among programs regarding resource problems, management, and protection	Human communities & institutions		Hawaii Invasive Species Council, Invasive Species Program (Wildlife), Forest Health, Watershed	Public, land & resource management agencies	<ul style="list-style-type: none">Hawaii Conservation Alliance Forestry & Wildlife Education &	<ul style="list-style-type: none">Reduced conflict & increased cooperation & participation in management & protection initiatives	2.2 3.4 3.6

Strategy: Recreation and Tourism

			Partnerships, NARS		<ul style="list-style-type: none"> Outreach <ul style="list-style-type: none"> HISC and CGAPS outreach staff Increasing public support for natural resource management & protection 	
Recreation and Tourism: Outreach and Education						
Long Term Strategy	Priority Landscape Areas(s)	Secondary Issues Addressed	Program Areas that Contribute	Key Stakeholders	Resources Available & Implementing Partners	Measures of Success
1. Children's Forest	Hawaii's State Forests and the Federal Experimental Tropical Forest					
2. Maintain a relationship with the Hawaii Environmental Education Alliance (HEEA)						
						Supports National Objectives

1. TAT = Transient Accommodation Tax administered by HTA; \$1m annually to State Parks and Trails.
2. HTA = Hawaii Tourism Authority
3. CELCP = Coastal Estuarine Land Conservation Program

Issue 8 : Forest Product Strategies

Hawaii has not traditionally maintained a large-scale forest products industry. Nevertheless, growing conditions in many parts of the state result in some of the highest growth rates for woody biomass in the world. Since the mid 1970's Hawaii has been encouraging the development of a viable forests products industry.

Forest Products						
Long Term Strategy	Priority Landscape Area(s)	Program Areas that Contribute	Key Stakeholders	Resources Available/required	Measure of Success	Supports National Objective
1. Foster the Development of an Integrated Forest Products Industry in Hawaii		Rural Development, Forest Stewardship	Hawaii Forest Products Industry (HFIA), Western Forestry Leadership Coalition, Hawaii Conservation Alliance, SPREP, SPC, Forest Service, The Nature Conservancy,	- Farm Bill Programs: Biomass & Biofuel	Increase State and Private land acreage under commercial forestry management Government agencies execute additional leases, licenses or other agreements to private sector for public commercial timberlands	
2. Develop and implement strategic research plan based on existing research and symposia findings regarding Forest Product Industry	State-Wide	Farm Bill: Biomass & Biofuel Programs; S&P Rural Development Program, Ecosystem Services Program, Forest Stew	Hawai'i Conservation Alliance, Pacific Islands Climate Change Cooperative, USFWS, The Nature Conservancy, CWRM, University of Hawai'i School of Ocean & Earth Sciences, USGS, NWHI	- Farm Bill Programs: Biomass & Biofuel, Rural Development; State Legislature funds	Key existing literature and research documented and results disseminated and available on appropriate clearinghouses, websites, at research stations, etc. Number new research projects initiated & completed.	

Hawaii Forest Product Strategies

3. Improve Opportunities for Forest Product Entities doing Business in Hawaii	State-wide	Watershed Partnerships, Forest Stewardship,	Hawai'i Conservation Alliance, Hawai'i Tourism Authority, USFWS, NPS, DOT, Office of Planning, HDOA, The Nature Conservancy, DOH, SPREP, SPC		Land tax structure favoring commercial forestry Secure access at key ports for export of forest products Complete wood properties testing to support certification of key Hawaii timber species or products for structural engineering & County permitting purposes	
4. Are Carbon Market for Hawaii? Assuming they will work in Hawaii, a study is needed to assist with the science and market development potential.	State-Wide		Hawai'i Conservation Alliance, NOAA, OHA, DOD, Hawai'i Tourism Authority, USFWS, NPS, DOT, Office of Planning, HDOA, The Nature Conservancy, DOH, Marine & Coastal Zone Advocacy Council, US Army Corps of Engineers, US Coast Guard, All Pacific Sea Grant Program, SPREP, SPC			

Issue 9: Multi-State and Regional Issues

Hawaii's impact on Multi-State and Regional issues

Tropical forests serve many unique and essential life-supporting roles for the world at large. These important ecosystems are heavily impacted by deforestation, urban growth and expansion, increased carbon emissions, and threats to tropical biodiversity. Hawaii one of the most remote island groups in the world and have developed a myriad of ecosystems with high rates of endemism among the plant, animal and invertebrate inhabitants (Holdridge 1947). It has also afforded opportunities for many different human cultures to coexist. These islands are highly developed; offering a wealth of products, technologies, and world class marine and terrestrial experiences that stimulate tourism, competitive sporting events, unique research and exciting business opportunities. They offer important opportunities for air and sea travelers, local and tourist recreation, as well as an important U.S. Military presence in the Pacific.

MultiState and Regional Issue: Invasive Species Transport						
Long Term Strategy	Priority Landscape Area(s)	Program Areas that Contribute	Key Stakeholders	Resources Available/ Required to Implement	Measure of Success	Supports National Objective
1) Develop and Implement a Collaborative Improvement Strategy (CIS) to raise awareness and implement programs to stop transport of insects & diseases, and export/import of species rated highly invasive across the Pacific.	Pacific-Wide: US & International	Forest Health Protection & Monitoring, Urban & Community Forestry, Conservation Education, EQIP, CIG,	US Dept. of Ag. in all US Pacific Islands, Hawaii Conservation Alliance, US Pacific Island Committee, SPREP, SPC, New Zealand DOC, Australia, NPS, NOAA, NRCS, Forest Service, DOI, The Nature Conservancy, US Airline Companies, APHIS, Homeland Security, RISC, DOD	USFWS, PICCI, University of Hawaii, University of Guam, Australian Universities, New Zealand Universities, Community Colleges and Heads of Forestry across Pacific, NOAA and National Weather Service, NRCS, Forest Service Competitive grants	<ul style="list-style-type: none">Develop better boarder entry protocolsMore awareness of invasive species issues by travelers that visit Pacific Islands and countriesMore stringent screening for incoming visitors to Pacific IslandsReduce transportation and relocation of highly invasive species	2.2 3.6
MultiState and Regional Issue: Protection of Genetic Diversity and Important Food Plants						
Long Term Strategy	Priority Landscape Area(s)	Program Areas that Contribute	Key Stakeholders	Resources Available/ Required to Implement	Measure of Success	Supports National Objective
2) Work collaboratively to mitigate potential impacts of loss of genetic diversity of food plants, native species and culturally important species. Identify data gaps and/or issues found in other matrices that would be enriched by	Pacific-Wide	FWS Section 7 grants, Urban & Community Forestry, Conservation Education, Forest Stewardship Program, Forest Legacy Program, schools, volunteer groups	Hawaii Conservation Alliance, Department of Interior (Pacific Islands Climate Change Cooperative), USFWS, NPS, USDA, HDOA, DOT, The Nature Conservancy, NOAA Office of Ocean & Coastal Resource Management, NOAA NWS, DOD, CWRM, University of Hawaii, School of Ocean & Earth Sciences, USGS, NMHI	US FWS, Dept. of Ag across Pacific, Local and Fed. EPA, Dept. of Transportation, NOAA, Coastal Zone Mgmt Program, Forest Service Competitive grants	<ul style="list-style-type: none">Increased food securityMore studies that define monitoring of Hawaiian biodiversitytest new crop species under new climate conditions.Shift agriculture to suitable new lands.Initiate more trainings and expanded nurseries production areas for rare plant seed protection and propagation with forest plants and food crops. Using methodologies that can be duplicated.	1.1 2.2 3.7

